

# Marine Anthuridea from Martinique, French Antilles, with redescriptions of some species (Crustacea: Isopoda)

by

**Hans-Georg MÜLLER**<sup>1</sup>

With 114 Figures

## ABSTRACT

Eleven species of marine Anthuridea (Crustacea: Isopoda) are recorded from various substrates at Martinique, French Antilles. *Amakusanthura geminsula* (Kensley, 1982), *Mesanthura paucidens* Menzies & Glynn, 1968 and *Accalathura crenulata* (Richardson, 1901) are redescribed. Supplementary descriptions are given for *Accalathura setosa* Kensley, 1984, *Minyanthura corallicola* Kensley, 1982 and *Paranthura infundibulata* Richardson, 1902.

## INTRODUCTION

In April 1990 the author carried out sampling of isopods in shallow marine habitats along the south-east coast of Martinique, French Antilles. Samples have been taken from a variety of substrates, more often from dead corals in exposed locations and in seagrass beds, ranging from the intertidal to about 3 m. Five species in 3 genera of the families Anthuridae and Paranthuridae are available. The Hyssuridae are represented by a single species. No new taxa were found, implying that the fauna of shallow water Anthuridea in the Caribbean is relatively well known. Several species included herein require a supplementary description or a complete redescription. Notes on the habits and vertical

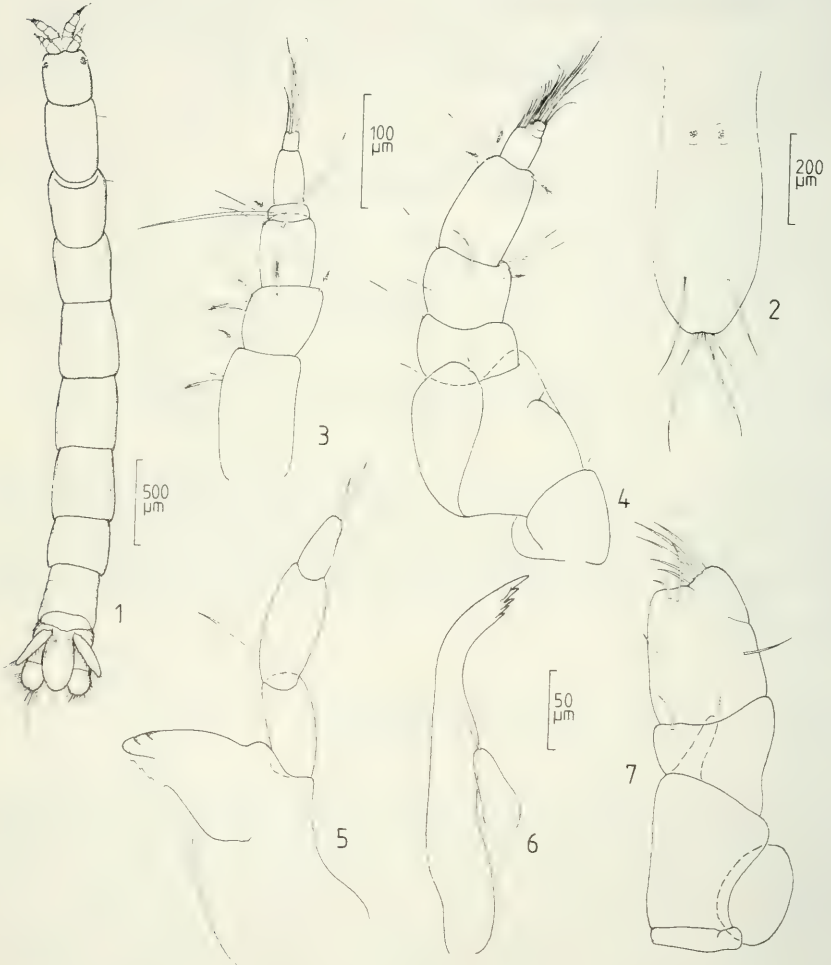
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<sup>1</sup> Pfaffenmühlerweg 2, 6331 Waldsolms-Brandobendorf, F.R.G.; Laboratoire de Biologie Marine et de Malacologie, Université de Perpignan, Avenue de Villeneuve, 66025 Perpignan Cedex, France.

distribution of the species are also given and the geographic distribution of the species is considered.

The research has been carried out in cooperation with the Laboratoire de Biologie Marine et de Malacologie in Perpignan, France (director: Dr. Bernard Salvat).

Specimens are deposited in the Muséum d'Histoire naturelle, Genève (MHNG) and the Muséum National d'Histoire naturelle, Paris (MNHN).



FIGS 1-7.

*Amakusanthura geminsula* (Kensley, 1982), immature adult: 1, dorsal view; 2, telson; 3, antenna 1; 4, antenna 2; 5, mandible; 6, maxilla; 7, maxilliped.

## ANTHURIDAE

*Amakusanthura* Nunomura, 1977*Amakusanthura geminsula* (Kensley, 1982) Figs 1-29

*Apanthura geminsula* KENSLEY, 1982: 323-325, figs 141-142.

*Apanthura geminsula*; KENSLEY, 1984b: 33.

*Apanthura geminsula*; NEGOESCU & WÄGELE, 1984: 108.

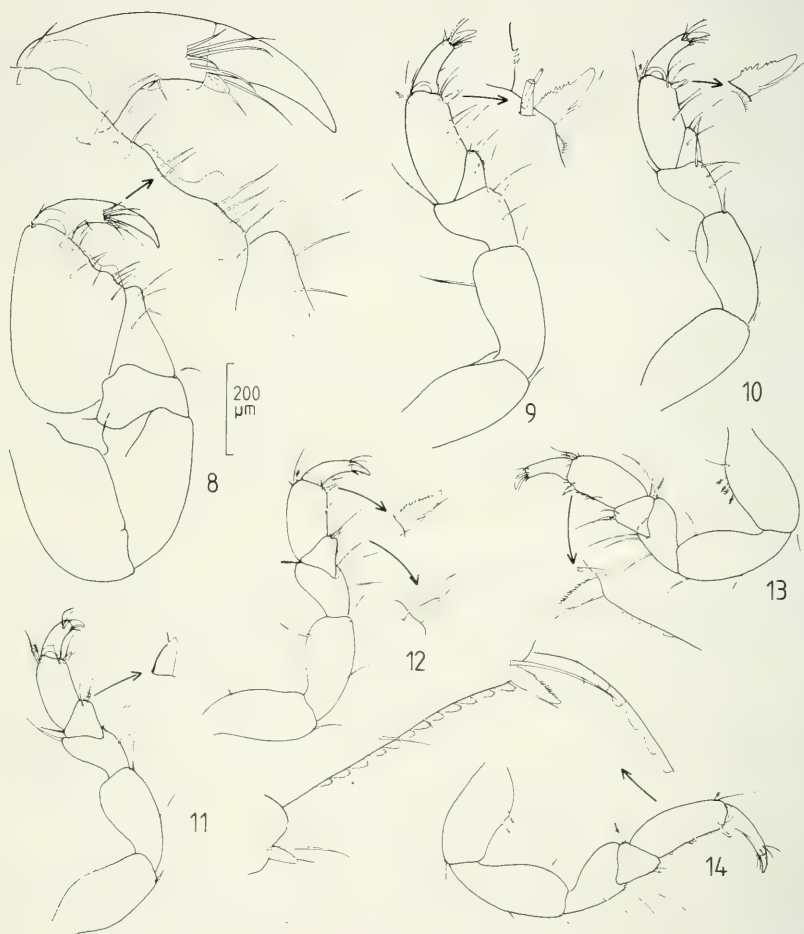
*Amakusanthura geminsula*; KENSLEY & SCHOTTE, 1989: 18-19, fig. 3A-E.

**M a t e r i a l .** — 2 immature adults (MHNG), south of Le Vauclin; edges of seagrass beds, mainly rhizomes of *Syringodium*, 0.5-1 m, 5 April 1990. 1♂, 6 immature adults, 2 postmanca, 1 manca (MNHN), 0.5-1 m, Petite Anse de Macabou; seagrass beds (*Syringodium*, *Thalassia*), 0-1 m, 7 April 1990. 1♂, 7 immature adults, 3 postmanca, 3 manca (MHNG), Madras, Baie de Tartane; dead corals in seagrass beds, 1-2 m, 18 April 1990. 3 immature adults (MHNG), Petite Anse de Macabou; algal vegetation on rocks and from nearshore patch reef, 0-1 m, 6-10 April 1990. 1 immature adult (MHNG), Petite Anse de Macabou; under stones and rocks, intertidal and in shallow rock-pools, 10 April 1990. 4♂, 7 immature adults, 1 postmanca, 1 manca (MHNG), Cap Chevalier; reef-flat of nearshore fringing-reef; from mainly dead corals (*Porites*), 0.5-1.5 m, 11 April 1990.

**D e s c r i p t i o n .** immature adult. — Body relatively slender, about 10 times longer than wide. Total length 3.5-4.2 mm. Cephalon with fairly small and darkly pigmented anterolateral eyes. Pereonites 4-6 with circular middorsal pit in anterior half of segment. Body proportions:  $C < 1 > 2 > 3 < 4 = 5 = 6 > 7$ . Pleonites fused, segment lines indicated laterally. Telson tongue-shaped, about 3 times longer than wide and distally broadly rounded; dorsodistal surface of telson with pair of long simple setae and distal margin with 6 setae of different lengths in characteristic arrangement.

Antenna 1, peduncle 3-articulated; proximal article about as long as second and third together; flagellum 3-articulated; second article elongate, first and third subequal in length; small terminal article with 4 simple setae and 2 aesthetascs. Antenna 2 relatively robust, peduncle 5-articulated; second article largest, grooved to accommodate peduncle of antennule; flagellum of 3 setose articles, proximal one longer than two distal articles together. Incisor of mandible with 3 cusps, lamina dentata with 4 marginal serrations; mandibular palp of 3 articles, with second article largest; first article with one, third with 2 simple setae. Maxilla elongate, medially curved in distal third; distal part 5-toothed, bearing very short seta between third and fourth indentation. Maxilliped robust; endite slender, tipped with short seta and extending slightly beyond distal margin of first palp article; palp of 3 articles, terminal one smallest, bearing 5 medially curved setae. Pereopod 1 robust, propodus expanded; palm shallowly sinuous, with lamella in proximal two thirds; mesial surface near articulation of dactylus with curved spine; posterodistal margin of dactylus with lamella and posterodistal edge with tooth-shaped spine; unguis of 3/4 dactylus length; posterodistal margin of elongate-triangular carpus with short lamella. Pereopods 2-7 similar to each others in shape and arrangement of spines and setae; posterodistal margin of propodus always with denticulate compound spine; carpus triangular, anterior margin free in pereopods 6-7; carpus of pereopods 4-7 with small compound spine at posterodistal margin. Pereopod 7, palm of propodus and posterior margin of dactylus with row of setulose scales. Pleopod 1, endopodite slender and 3/4 length of operculiform exopodite; endopodite with 3, exopodite with 20 distal plumose setae (drawn as simple setae); sympodite with 3 retinaculae. Uropodal endopodite roughly oval,

1.3 times longer than wide; dorsal surface near ectal and distal margin with 7 feathered sensory setae; ectal and distal margin with several long setae, in particular; endopodite slightly extending beyond distal margin of telson; uropodal exopodite with shallow distal excavation, its margin with several plumose setae (drawn as simple setae) and some simple setae.

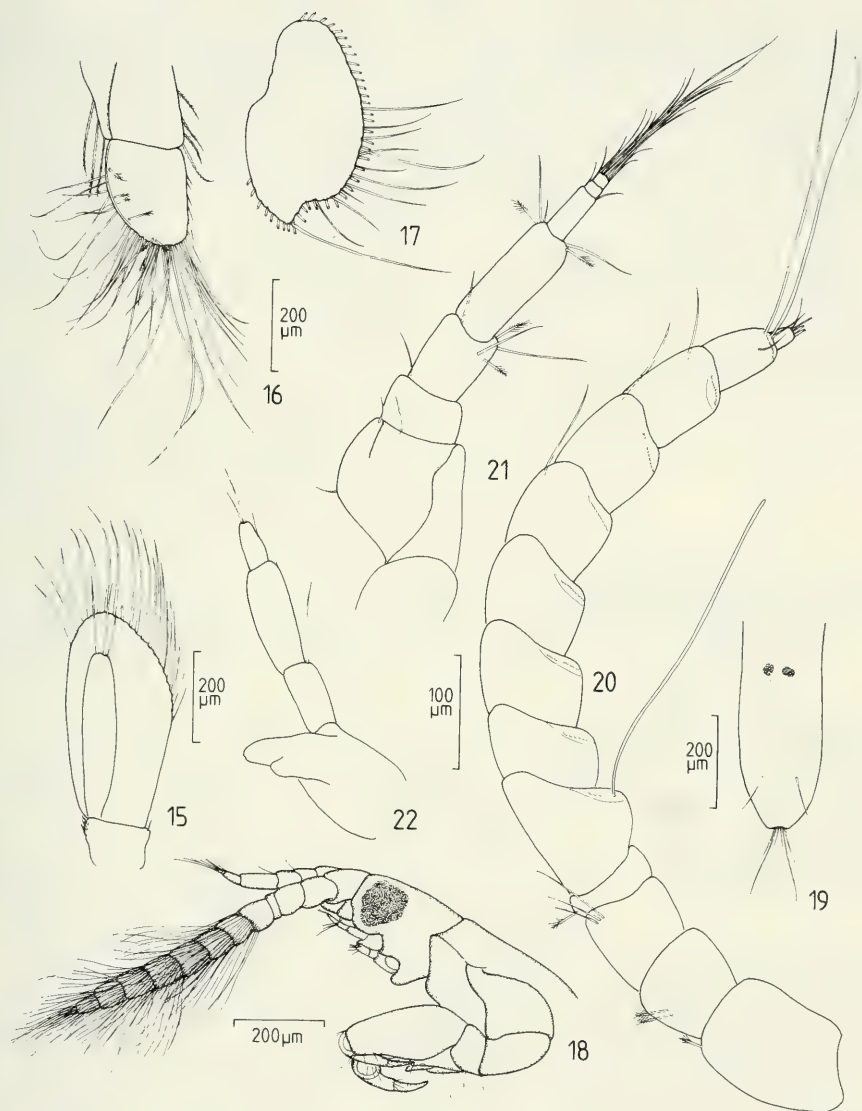


FIGS. 8-14.

*Amakusanthura geminsula* (Kensley, 1982), immature adult: 8, pereopod 1; 9, pereopod 2; 10, pereopod 3; 11, pereopod 4; 12, pereopod 5; 13, pereopod 6; 14, pereopod 7.

♂. — In habitus similar to immature adult, eyes greatly enlarged and darkly pigmented. Total length 3.5 mm. Cephalon anterior of maxilliped articulation with rounded hump. Telson similar to immature adult, dorso-distal setae shorter. Antenna 1,





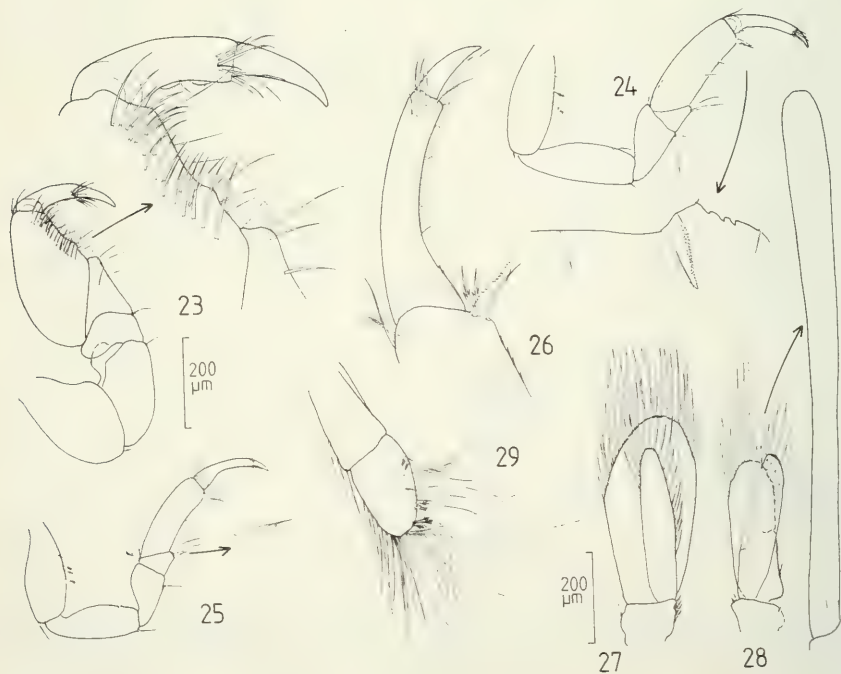
FIGS 15-22.

*Amakusanthura geminsula* (Kensley, 1982), 15-17 immature adult, 18-22 ♂: 15, pleopod 1; 16, uropodal endopodite; 17, uropodal exopodite; 18, anterior part of body, lateral view; 19, telson; 20, antenna 1; 21, antenna 2; 22, mandible.

flagellum of 10 articles, articles 2-9 bearing whorl of many filiform aesthetascs. Antenna 2, two distal peduncular articles and first flagellar article more slender than in immature adult. Incisor of mandible without sclerotized cusps and lamina dentata. Pereopod 1 similar in outline to immature adult, propodus less expanded; palm faintly sinuous, without lamella; mesial surface near palm with 21 curved setae; posterodistal margin of carpus with short lamella. Pereopods 2-7 more slender than in immature adult; posterodistal margin of pereopod 7 with denticulate, robust compound spine and 2 more slender compound spines; two distal thirds of posterior margin of dactylus with fringe of scales. Uropodal endopodite oval, more slender than in immature adult. Pleopod 1, endopodite slender,  $4/5$  length of operculiform exopodite; margin of endopodite with 17, of exopodite with 19 plumose setae (drawn as simple setae); sympodite with 4 retinaculae. Pleopod 2, endopodite more slender and slightly longer than exopodite; appendix masculina articulating at distal proximal third and extending with  $1/3$  of its entire length beyond distal margin of endopodite; appendix masculina slightly widening in distal half, its apex rounded.

Postmanca and manca. — In their habitus similar to immature adult. Total length 2.5 mm and 2.0 mm, respectively.

R e m a r k s . — *Amakusanthura geminsula* resembles most closely *Amakusanthura mana* (Kensley, 1979) from the Fiji Islands. Both are quite similar in their habitus, having



Figs 23-29.

*Amakusanthura geminsula* (Kensley, 1982), ♂: 23, pereopod 1; 24, pereopod 2; 25, pereopod 4; 26, distal pereopod 7; 27, pleopod 1; 28, pleopod 2; 29, uropodal endopodite.

dorsal pits on pereonites 4-6 and the pleonites fused. However, *A. mana* has 5 pairs of dorsal setae on the telson and the uropodal rami are more slender than in *geminsula* (cf. KENSLEY 1979: 814, figs 1-2).

*A. geminsula* lives in very shallow water from the intertidal to about 1.5 m. It was rather common in Martinique, where it was found in seagrass beds, under stones and rocks as well as associated with dead coral substratum.

Up to now the species was known from Belize and Jamaica (KENSLEY & SCHOTTE 1989: 19). The record from Martinique extends its known range eastward to the Lesser Antilles. It is noteworthy that this species has not been found by the author at the Caribbean Coast of Colombia, where extensive field work has been carried out over more than one year.

### **Mesanthura** Barnard, 1914

#### **Mesanthura paucidens** Menzies & Glynn, 1968 Figs 30-58

*Mesanthura paucidens*; MENZIES & GLYNN, 1968: 27-28, fig. 9A-G.

*Mesanthura paucidens*; KENSLEY, 1982: 334, figs 150-151.

*Mesanthura paucidens*; KENSLEY, 1984b: 33.

*Mesanthura paucidens*; NEGOESCU & WÄGELE, 1984: 126.

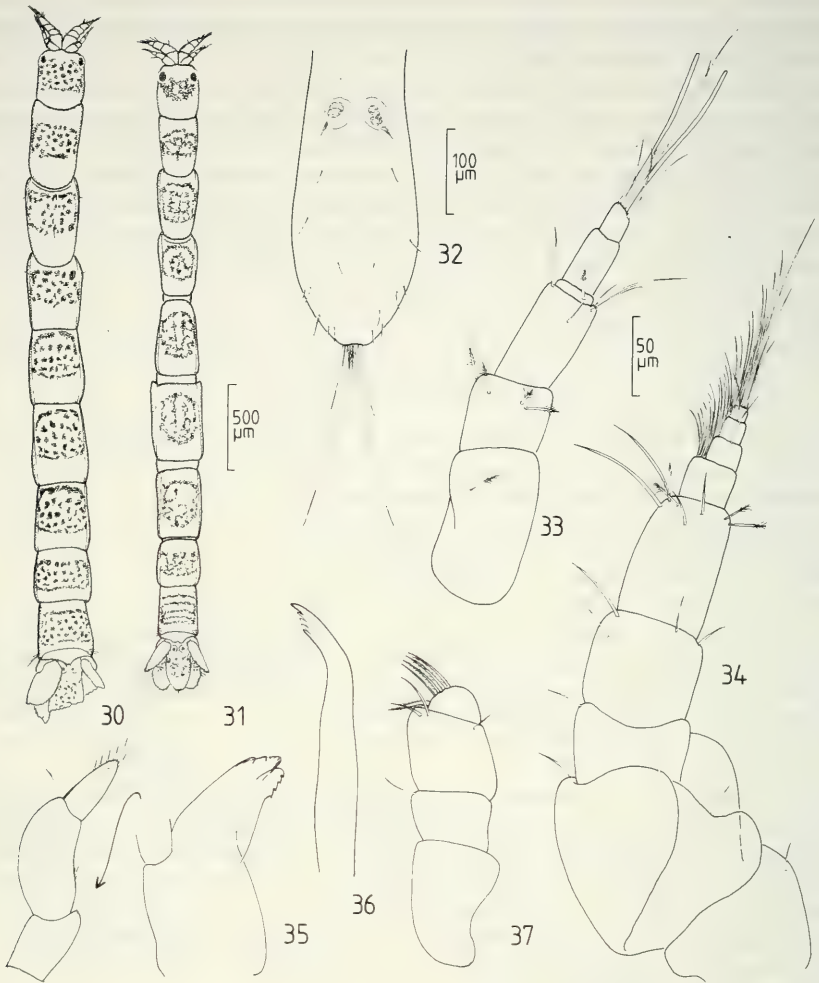
*Mesanthura paucidens*; KENSLEY & SNELGROVE, 1987: 193-194.

*Mesanthura paucidens*; KENSLEY & SCHOTTE, 1989: 51, figs 19A, 21 E-I.

**M a t e r i a l .** — 1♂ (MHNG), Madras, Baie de Tartane; dead corals in seagrass beds, 1-2 m, 18 April 1990. 2 immature adults (1 preparatory ♂), 1 manca (MHNG), Petite Anse de Macabou; dead corals from nearshore patch-reef; exposed reef-flat and seaside margin, 0-2 m, 6-15 April 1990. 1 immature adult, 1 postmanca (MNHN), Cap Chevalier; reef-flat of nearshore fringing reef; from mainly dead corals (*Porites*), 0.5-1.5 m, 11 April 1990.

**D e s c r i p t i o n**, immature adult. — Body slender, about 12 times longer than wide. Total length 3.6-4.1 mm. Cephalon with small, well pigmented anterolateral eyes. Cephalon, pereonites and pleon generally with roughly square or rectangular pigmentations composed of small pigment spots. Sometimes these spots are fused, leading to a pattern as shown in fig. 31. Body proportions:  $C < 1 = 2 > 3 = 4 < 5 > 6 > 7$ . Pleonites fused. Telson tongue-shaped, 2.3 times longer than wide; dorsal surface of telson in two distal thirds with some short setae; distal margin of telson with 2 pairs of long simple setae and short medial pair of feathered setae.

Antenna 1, peduncle 3-articulated, with second article shortest and proximal article longest and widest; flagellum 3-articulated; first article shortest and widest, second longest; terminal article bearing 5 simple setae and 2 aesthetascs. Antenna 2, peduncle 5-articulated; second article largest, grooved to accommodate peduncle of antenna 1; flagellum of 4 setose articles, decreasing in size distally. Incisor of mandible 3-cuspidate, lamina dentata with 4 indentations; second article of 3-articulated palp longest and widest; first and second article bearing short distal seta; third article with 6 short setae in distal half. Maxilla elongate, medially curved in distal half, distal part 5-toothed. Maxilliped lacking endite, palp 3-articulated; first palp article with one, second with 3 simple setae; third article semicircular, medial margin with 4 plumose setae and a simple seta. Pereopod 1 with propodus expanded; palm with rounded hump in proximal half, bearing some simple setae; posterodistal margin of dactylus with 2 scales; unguis 1.3 times longer than dactylus; carpus elongate-triangular, posterodistal margin with 3 simple setae increasing

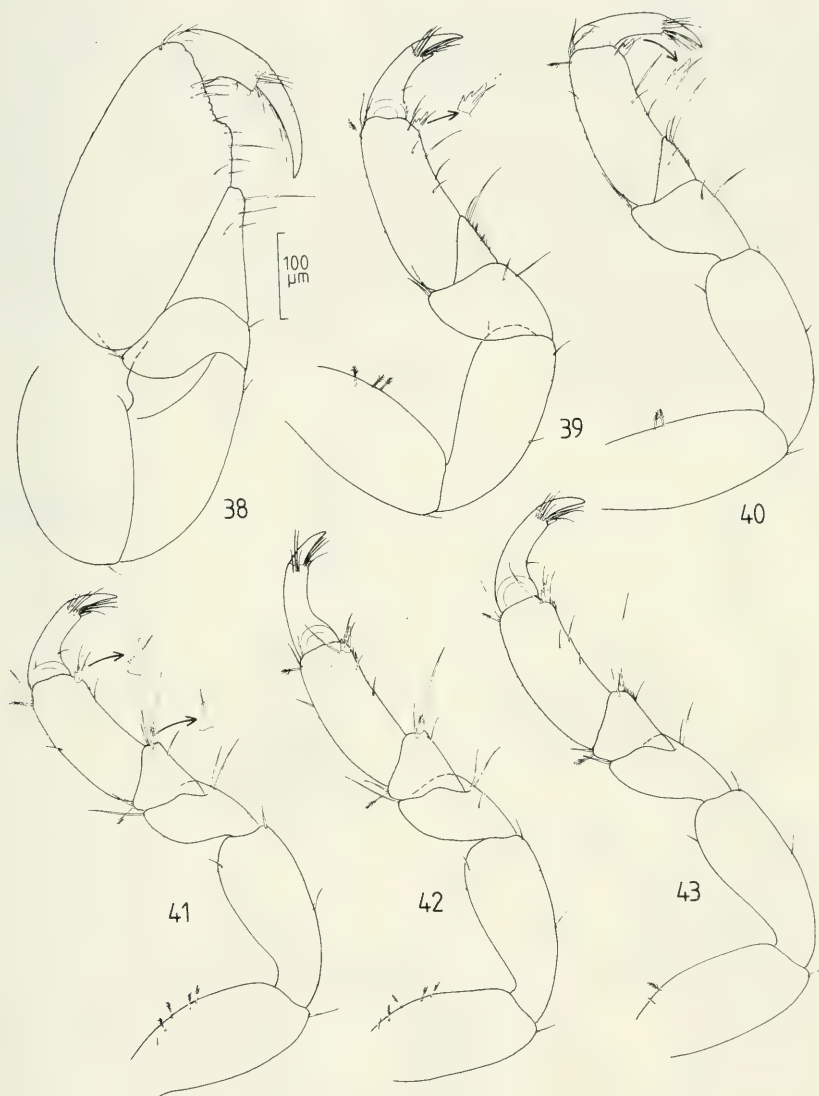


FIGS 30-37.

*Mesanthura paucidens* Menzies & Glynn, 1968, immature adult: 30, dorsal view; other specimen, dorsal view; 32, telson; 33, antenna 1; 34, antenna 2; 35, mandible; 36, maxilla; 37, maxilliped.

in length distally. Pereopods 2-7 in shape and size similar to each others; palm of propodus faintly concave, bearing denticulate compound spine distally; moreover, palm of pereopod 7 propodus with row of scales in distal half and with 2 more slender compound spines; carpus of pereopods 2-3 triangular, lacking free anterior margin; carpus of pereopods 4-7 trapezoid, with free anterior margin and short compound spine at posterodistal margin. Pleopod 1, endopodite slender,  $3/4$  length of operculiform exopodite; endopodite distally with 3, exopodite with 18 plumose setae (drawn as simple setae); sympodite with 3 retinaculae. Sympodite of uropod subequal in length to

endopodite; endopodite roughly oval, bearing several long, simple setae and feathered setae along distal and ectal margin, in particular; dorsal surface near ectal and distal margin with 7 feathered sensory setae; endopodite not extending beyond distal margin of telson; exopodite roughly oval, with shallow distal notch; ectal and distal margin with some simple and several feathered setae.



FIGS 38-43.

*Mesanthura paucidens* Menzies & Glynn, 1968, immature adult: 38, pereopod 1; 39, pereopod 2; 40, pereopod 3; 41, pereopod 4; 42, pereopod 5; 43, pereopod 6.

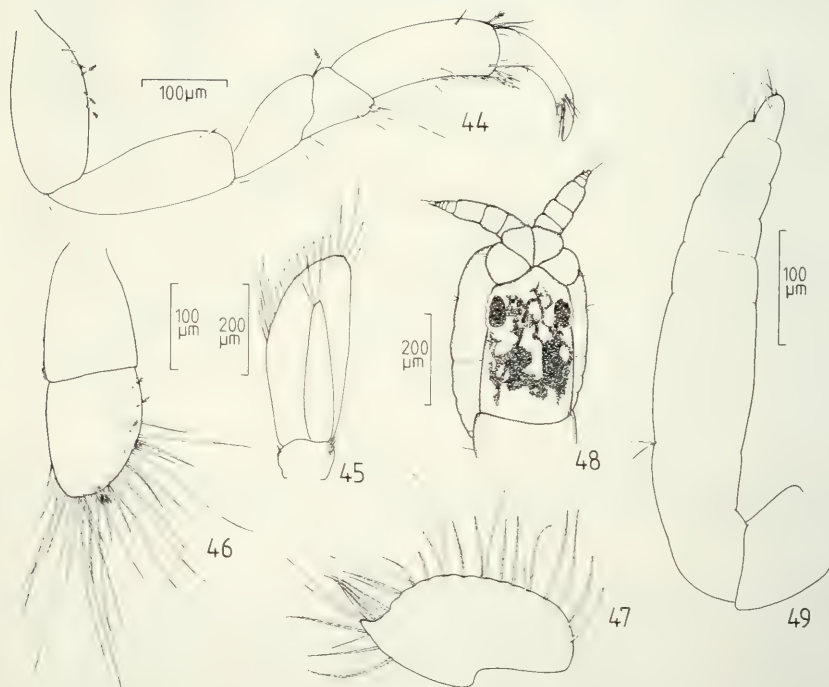


Preparatory ♂. — In size and colour pattern similar to fig. 31 specimen. Flagellum of antenna 1 expanded, suture lines of 5 distal articles distinct; two distal articles with short aesthetasc and some simple setae.

♂. — In habitus and pigmentation similar to immature adult. Total length 3.2 mm. Telson quite similar to immature adult, distal margin with 3 pairs of simple setae and short medial pair of feathered setae.

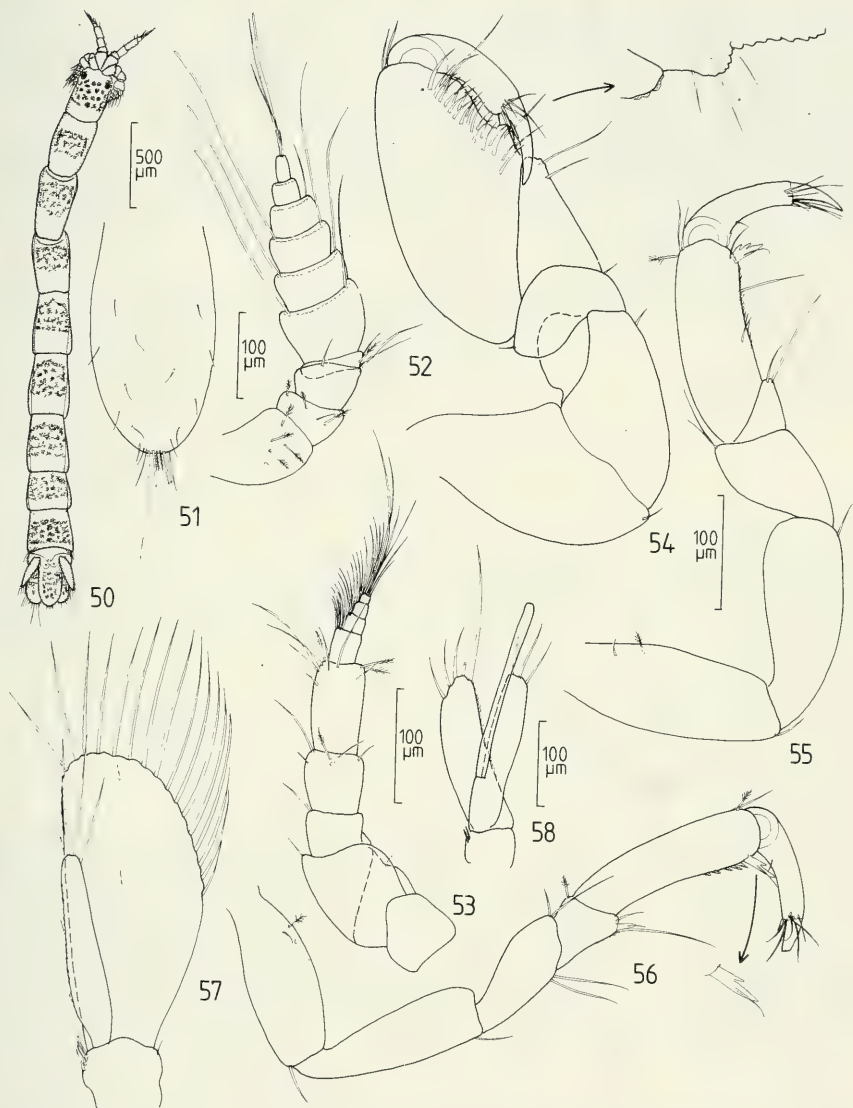
Antenna 1, peduncle 3-articulated; proximal article about as long as second and third article together; flagellum of 7 articles, first one shortest and much wider than long; articles 2-6 bearing whorl of filiform aesthetascs; terminal article longer than wide, with 2 simple setae and single aesthetasc. Antenna 2, peduncular articles and first article of flagellum more slender than in immature adult. Pereopod 1 in outline similar to immature adult; mesial surface near palm with 23 curved setae. Pereopods 2-7 in spination and setation similar to immature adult, more slender. Pleopod 1, endopodite slender, 2/3 length of operculiform exopodite; distal margin of endopodite with 3, of exopodite with 16 plumose setae (drawn as simple setae); sympodite with 4 retinaculæ. Rami of pleopod 2 relatively slender and subequal in length; appendix masculina of endopodite articulating at distal proximal third, extending with 2/5 of its entire length beyond distal margin of endopodite; endopodite with 3, exopodite with 5 distal plumose setae (drawn as simple setae); sympodite with 2 retinaculæ.

Manca: In habitus quite similar to immature adult. Total length 2.1 mm.



FIGS 44-49.

*Mesanthura paucidens* Menzies & Glynn, 1968, immature adult (48-49 preparatory ♂): 44, pereopod 7; 45, pleopod 1; 46, uropodal endopodite; 47, uropodal exopodite; 48, cephalon, dorsal view; 49, antenna 1.



FIGS 50-58.

*Mesanthura paucidens* Menzies & Glynn, 1968, ♂: 50, dorsal view; 51, telson; 52, antenna 1; 53, antenna 2; 54, pereopod 1; 55, pereopod 2; 56, pereopod 7; 57, pleopod 1; 58, pleopod 2.

**R e m a r k s .** — *M. paucidens* is easily distinguishable from its congeners in the tropical Western Atlantic by its characteristic pigment pattern. Because the original description is very short and the supplementary descriptions by KENSLEY (1982: 334) and KENSLEY & SCHOTTE (1989: 51) lack or miss-interpret some important features, a complete redescription was thought to be useful. As far as known from the descriptions, species of *Mesanthura* lack an endite at the maxilliped and bear some plumose setae at the medial margin of the terminal palp article of the maxilliped. The figures in KENSLEY (1982) and KENSLEY & SCHOTTE (1989) are confusing, because they show the setae at the terminal palp article as being simple. The maxilliped is shown to have a distinct endite tipped with a short seta. This is surely not correct and is considered an artefact. It happens sometimes that during dissection of mouthparts the endopodite of the maxilla breaks off and becomes lost or remains attached to the maxilliped. In the latter case it can be easily misinterpreted as an endite of the maxilliped.

The intrageneric affinities of *Mesanthura paucidens* are not clear. According to MENZIES & GLYNN (1968: 27) it resembles *Mesanthura hieroglyphica* MILLER & MENZIES, 1952 from Hawaii. However, this species is incompletely described.

*M. paucidens* was known from Florida, Belize, Puerto Rico and Jamaica, living from the intertidal to about 15 m (KENSLEY & SCHOTTE 1989: 51).

### ***Mesanthura pulchra* Barnard, 1925**

*Mesanthura pulchra* BARNARD, 1925: 145, fig. 9e.

*Mesanthura decorata*; MENZIES & GLYNN, 1968: 26-27, fig. 8 A-I.

*Mesanthura pulchra*; SCHULTZ, 1969: 109, fig. 151.

*Mesanthura pulchra*; KENSLEY, 1982: 336-339, figs 152-153.

*Mesanthura floridensis* MENZIES & KRUCZYNSKI, 1983: 336-339, figs 152-153.

*Mesanthura pulchra*; KENSLEY, 1984b: 33.

*Mesanthura pulchra*; NEGOESCU & WÄGELE, 1984: 126.

*Mesanthura pulchra*; WÄGELE, 1984: 389-394, figs 1-4.

*Mesanthura pulchra*; KENSLEY, 1987a: 118-119.

*Mesanthura pulchra*; KENSLEY & SNELGROVE, 1987: 195.

*Mesanthura pulchra*; KENSLEY & SCHOTTE, 1989: 52-53, figs 19B, 21 J-N.

**M a t e r i a l .** — 1 immature adult, 1 postmanca (MNHN), Petite Anse de Macabou; seagrass beds (*Syringodium*, *Thalassia*), 0-1 m, 7 April 1990. 1 postmanca (MHNG), Madras, Baie de Tartane; dead corals in seagrass-beds, 1-2 m, 18 April 1990. 1♂, 1 immature adult, 1 postmanca (MHNG), Petite Anse de Macabou, algal vegetation on rocks and on nearshore patch reef, 0-1 m, 6-10 April 1990. 2 immature adults, 1 postmanca (MHNG), Petite Anse de Macabou; dead corals from nearshore patch reef; exposed reef flat and seaside margin, 0-2 m, 6-15 April 1990. 3 immature adults (MHNG), Cap Chevalier; reef flat of nearshore fringing reef, exposed location; from mainly dead corals (*Porites*), 0.5-1.5 m, 11 April 1990. 1♂ (MHNG), La Trinité, bank reef west of Pte. Rouge; Anse Rivière, from dead corals on exposed reef-flat, 0-2 m, 12 April 1990.

**R e m a r k s .** — This species has been redescribed in detail by WÄGELE (1984: 389). It may be more closely allied with *Mesanthura bivittata* KENSLEY, 1987 from Belize, which has a similar colour pattern. However, the chromatophores of *bivittata* are more numerous and in a more compact arrangement (cf. KENSLEY 1987b: 559, figs 1-2).

The species lives in shallow water from the intertidal to about 37 m.

*M. pulchra* is rather common in the Caribbean and Gulf of Mexico. A summary of the records is given in KENSLEY & SCHOTTE (1989: 53).

**Pendanthura** Menzies & Glynn, 1968**Pendanthura hendleri** Kensley, 1984

*Pendanthura hendleri* KENSLEY, 1984a: 18-19, fig. 11.

*Pendanthura hendleri*; KENSLEY & SCHOTTE, 1989: 56, fig. 24A-E.

**Material.** — 1♂ (MHNG), Cap Chevalier; reef-flat of nearshore fringing reef; from mainly dead corals (*Porites*), 0.5-1.5 m, 11 April 1990.

**Remarks.** — *P. hendleri* is more closely allied with *Pendanthura rarotonga* from the Society Islands (MÜLLER, 1991, in press) and the Cook Islands.

Up to now it was reported only from Panama and Belize, with a vertical distribution of 0-30 m (KENSLEY & SCHOTTE 1989: 56). The record from Martinique considerably extends its known range to the eastern Caribbean.

**Pendanthura tanaiformis** Menzies & Glynn, 1968

*Pendanthura tanaiformis* MENZIES & GLYNN, 1968: 32, fig. 12 A-I.

*Pendanthura tanaiformis*; KENSLEY, 1982: 345-348, figs 159-160.

*Pendanthura tanaiformis*; KENSLEY 1984b: 33.

*Pendanthura tanaiformis*; NEGOESCU & WÄGELE, 1984: 132.

*Pendanthura tanaiformis*; KENSLEY & SCHOTTE, 1989: 56-57, fig. 24 F-H.

**Material.** — 1♀ (MHNG), La Trinité, bank reef west of Pte. Rouge; Anse Rivière, exposed reef-flat, dead corals, 0-2 m, 12 April 1990.

**Remarks.** — The interspecific affinities of *P. tanaiformis* are not clear.

The species lives in shallow water from 0-2 m and was known from Bermuda, Belize, the Atlantic Coast of Mexico and Puerto Rico (KENSLEY & SCHOTTE, 1989: 58). The present record is the first from the Lesser Antilles.

## PARANTHURIDAE

**Accalathura** Barnard, 1925**Accalathura crenulata** (Richardson, 1901) Figs 59-83

*Calathura crenulata* RICHARDSON, 1901: 509-510.

*Calathura crenulata*; RICHARDSON 1905: 74-75, figs 58-61.

*Accalathura crenulata*; BARNARD, 1925: 147-148; fig. 3, pl. 4.

*Accalathura crenulata*; NIERSTRASZ, 1941: 242.

*Accalathura crenulata*; MENZIES & GLYNN, 1968: 33-34, fig. 13.

*Accalathura crenulata*; SCHULTZ, 1969: 96, fig. 128.

*Accalathura crenulata*; KOENING, 1972: 261-270.

*Accalathura crenulata*; POORE, 1980: 59.

*Accalathura crenulata*; KENSLEY, 1982: 348.

*Accalathura crenulata*; MENZIES & KRUCZYNSKI, 1983: 35-38, fig. 12.

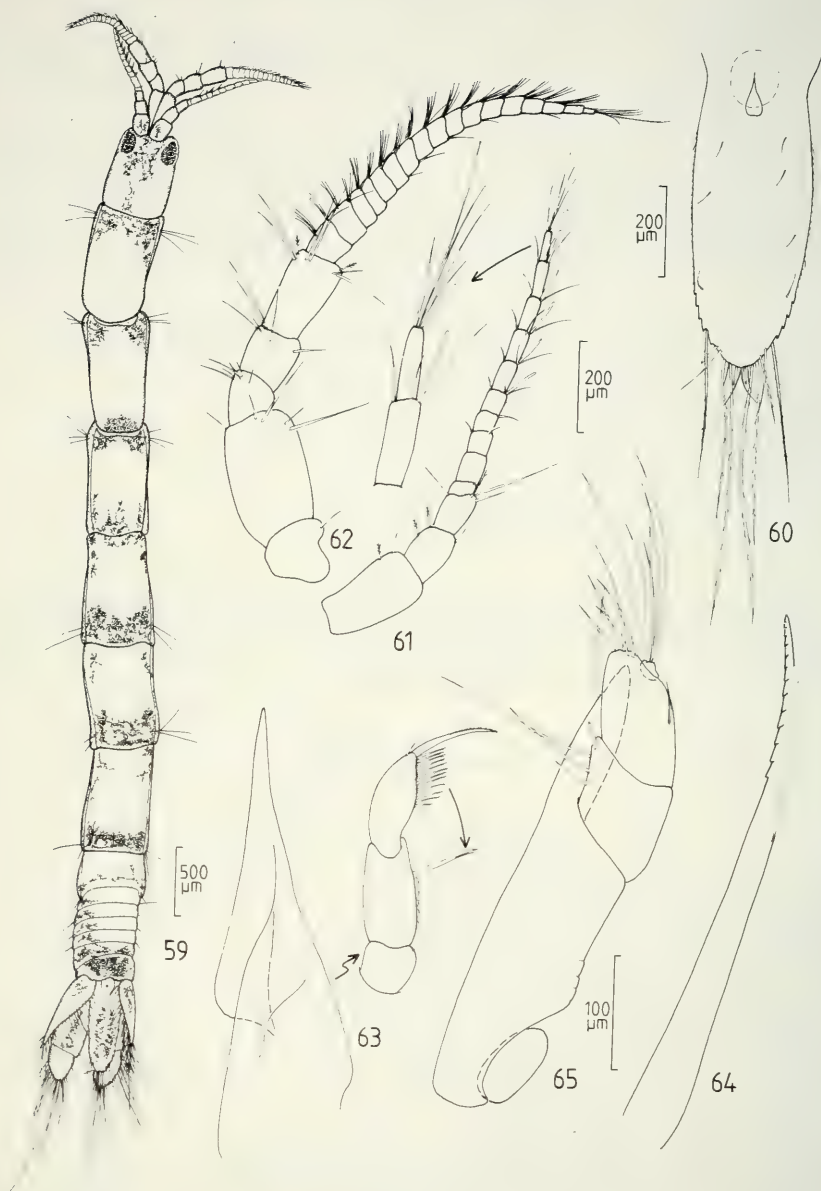
*Accalathura crenulata*; KENSLEY, 1984b: 33.

*Accalathura crenulata*; NEGOESCU & WÄGELE, 1984: 104.

*Accalathura crenulata*; KENSLEY 1987a: 120.

*Accalathura crenulata*; KENSLEY & SCHOTTE, 1989: 65, fig. 29 A-D.

**Material.** — 1♀ (MHNG), Petite Anse de Macabou; seagrass beds (*Syringodium*, *Thalassia*), 0-1 m, 7 April 1990. 1♂, 2 immature adults, 1 manca (MHNG), Madras, Baie de Tartane;



FIGS 59-65.

*Accalathura crenulata* (Richardson, 1901), immature adult: 59, dorsal view; 60, telson; 61, antenna 1; 62, antenna 2; 63, mandible; 64, maxilla; 65, maxilliped.



dead corals in seagrass beds, 1-2 m, 18 April 1990. 2 immature adults (MNHN), Petite Anse de Macabou; dead corals from nearshore patch reef, exposed reef flat and seaside margin; 0-2 m, 6-15 April 1990.

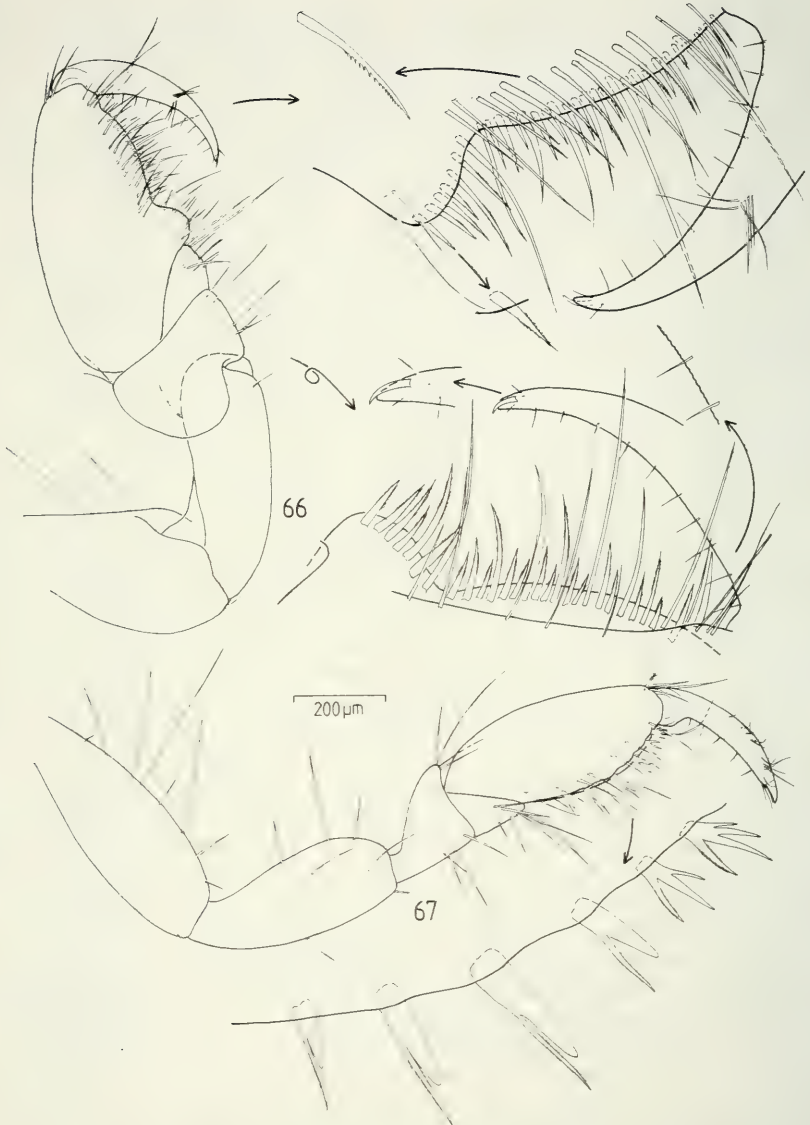
**Description**, immature adult. — Body slender, about 14 times longer than wide. Total length 4.9-6.8 mm. Cephalon, pereon and pleon with irregular pigment reticulations. Head with darkly pigmented, relatively large anterolateral eyes. Body proportions:  $C < 1 < 2 = 3 = 4 > 5 = 6 > 7$ . Pleonites free and subequal in length. Telson tongue-shaped, 2.7 times longer than wide, with large proximal statocyst; distal third of telsonic margin distinctly serrate; dorsal surface of telson with some short simple setae; several short and long setae in characteristic arrangement at distal margin of telson, the more longer setae sparsely feathered.

Antenna 1, peduncle 3-articulated; proximal article largest, slightly longer than second and third together; flagellum 10-articulated; articles 5-10 bearing short aesthetascs. Antenna 2, peduncle 5-articulated; second article longest and widest, articles 3-5 increasing in length distally; flagellum of 17 setose articles, decreasing in width distally. Mandible styletto-like, palp 3-articulated; proximal article of palp shortest, bearing simple seta; second article longest, with row of 6 setulose scales; third article with short distal simple seta and rather strong fringed spine; moreover, third article with 12 slender compound spines. Maxilla elongate, spine-like; distal third of medial margin with 13 indentations and outer margin with narrow lamella. Maxilliped with strongly developed endite, extending beyond articulation of third palp article; palp of maxilliped 3-articulated; second article longest, bearing 6 distal, curved setae; terminal article minute, with 4 long simple setae; proximal palp article bearing 4 simple setae at medial margin. Pereopod 1 with propodus expanded; palm with strong proximal, rounded hump bearing 7 spines and 2 simple setae; palm convex with many curved setae and spines, as figured; carpus roughly triangular, posterior margin convex, bearing 7 simple setae; claw tipped with short curved spine. Propodus of pereopod 2 elongate-oval; palm convex, bearing 6 compound spines, the 2 distal ones being branched; carpus triangular, lacking free anterior margin. Pereopod 3, propodus less expanded than in pereopod 2; palm convex, compound spines similar to pereopod 2. Pereopods 4-7 similar to each others; pereopods 4-5 more robust than pereopods 6-7; propodus and carpus of pereopods 4-7 elongate-rectangular; posterior margin of propodus and carpus bearing 4 compound spines in pereopods 4-7, respectively; anterodistal margin of propodus in pereopod 7 with 3 slender compound spines. Pleopod 1, endopodite slender, 9/10 length of operculiform exopodite; endopodite with 6, exopodite with 18 distal plumose setae (drawn as simple setae); sympodite with 4 retinaculae. Sympodite of uropod 2.5 times longer than endopodite; endopodite roughly oval, distal margin with several long, simple setae; medial margin with slender spine; dorsal surface of endopodite near ectal and distal margin with 6 feathered sensory setae; exopodite elongate-triangular; ectal and distal margin with many long setae, in particular.

♀. — In general features as immature adult. Total length 12.5 mm.

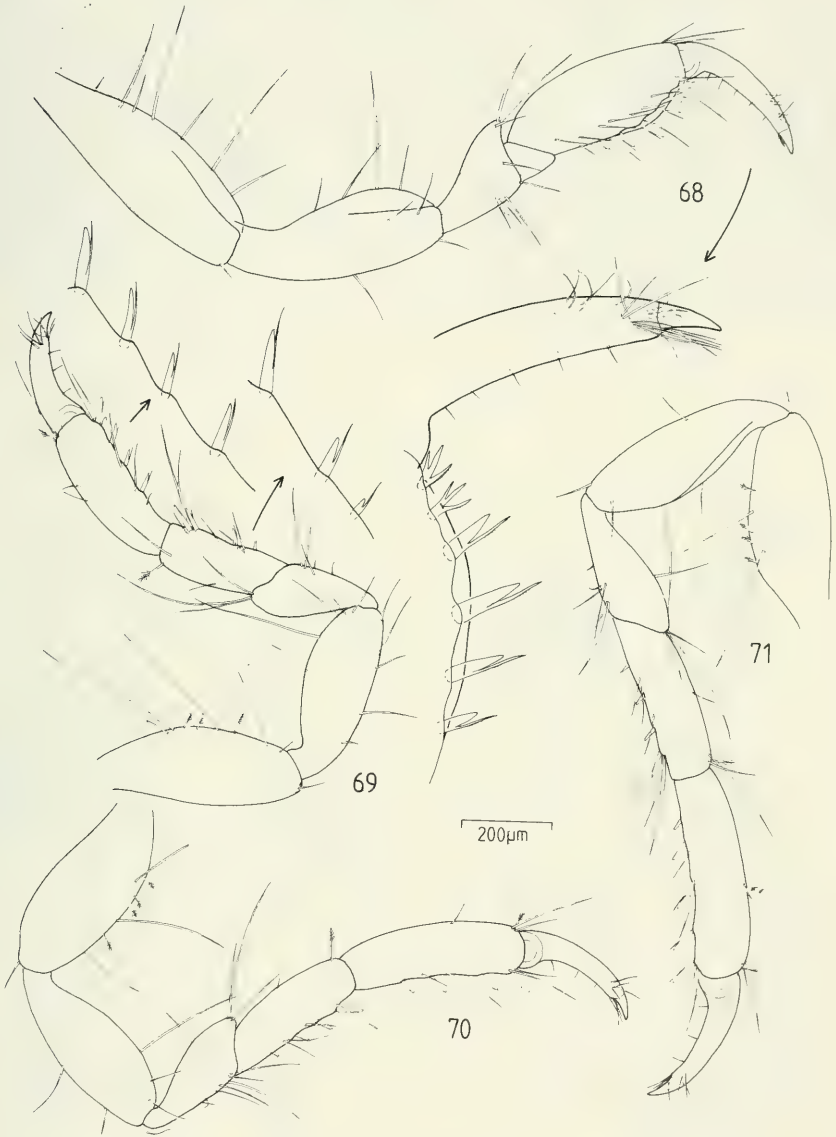
♂. — In habitus similar to immature adult and ♀, eyes not enlarged. Total length 5.4 mm.

Antenna 1, peduncle 3-articulated; proximal article longer than articles 2 and 3 together; flagellum 14-articulated, with proximal article shortest, being much wider than long; articles 2-7 bearing whorl of filiform aesthetascs; moreover, articles 7-13 bearing short and more robust aesthetascs, as in ♀ and immature specimens. Antenna 2, peduncle 5-articulated; articles 2-5 more slender than in ♀ and immature specimens; flagellum of 16 setose articles. Pereopod 1 in outline similar to immature adult and ♀, mesial surface



FIGS 66-67.

*Accalathura crenulata* (Richardson, 1901), immature adult: 66, pereopod 1, propodus and dactylus viewed from different angles; 67, pereopod 2.

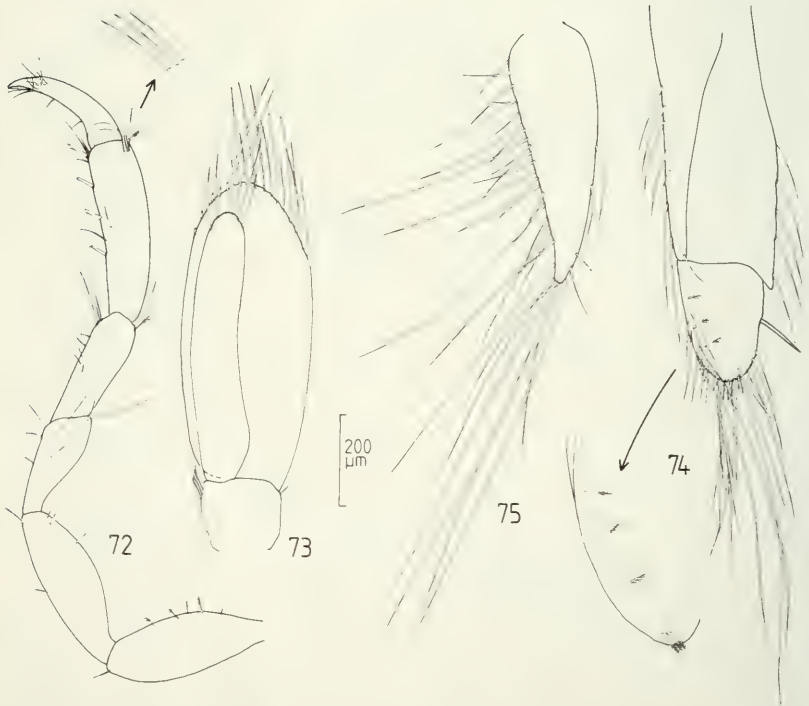


FIGS 68-71.

*Accalathura crenulata* (Richardson, 1901), immature adult: 68, pereopod 3; 69, pereopod 4; 70, pereopod 5; 71, pereopod 6.

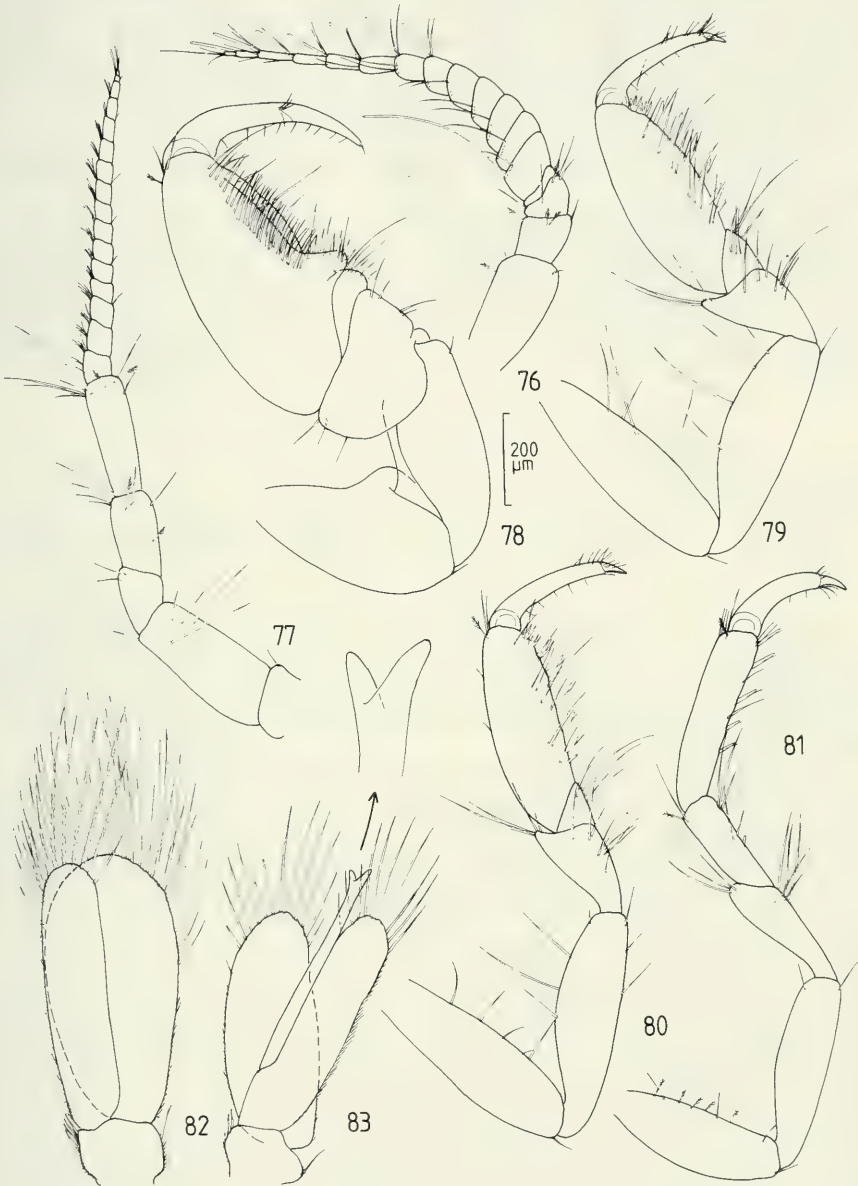
near palm with many curved setae. Pereopods 2-7 more slender than in ♀ and immature specimens; propodus of pereopod 2 somewhat expanded; palm weakly convex, with 8 compound spines, 2 distal compound spines branched; carpus roughly triangular, lacking free anterior margin; posterior margin weakly convex, bearing some simple setae. Pereopod 3, propodus less expanded than in pereopod 2, arrangement of compound spines quite similar. Pereopods 4-7 similar to each others, propodus and carpus elongate-rectangular; posterior margin of propodus with 5 compound spines; moreover, anterodistal margin of propodus in pereopod 7 with 3 slender spines. Pleopod 1, rami subequal in length, endopodite more robust than in ♀ and immature specimens; endopodite with 9 distal plumose setae (drawn as simple setae); distal margin of operculiform exopodite with about 40, short and long plumose setae in two rows (drawn as simple setae); sympodite more slender than exopodite; bifurcate appendix masculina articulating at distal proximal fourth, extending beyond ramus with 1/5 of its entire length; endopodite with 10, exopodite with 11 distal plumose setae (drawn as simple setae); sympodite with 3 retinaculae.

Manca. — In habitus similar to immature adult. Total length 3.5 mm.



FIGS 72-75.

*Accalathura crenulata* (Richardson, 1901), immature adult: 72, pereopod 7; 73, pleopod 1; 74, uropodal sympodite and endopodite; 75, uropodal exopodite.



FIGS 76-83.

*Accalathura crenulata* (Richardson, 1901), ♂: 76, antenna 1; 77, antenna 2; 78, pereopod 1; 79, pereopod 2; 80, pereopod 3; 81, pereopod 7; 82, pleopod 1; 83, pleopod 2.



**R e m a r k s .** — Although *Accalathura crenulata* is a common species in the tropical and temperate Western Atlantic, it has never been described in detail. In contrast to MENZIES & KRUCZYNSKI (1983: 36, Fig. 12 C) the palp of the maxilliped is composed of 3 articles, not of 2 articles as figured erroneously. The distal margin of the telson is distinctly serrate, not smooth as figured in KENSLEY & SCHOTTE (1989: 66, Fig. 29 D). Most species of the genus are poorly described, which makes it impossible to discuss their interrelationships. The genus *Accalathura* is greatly in need of revision.

*A. crenulata* was found associated with various substrates from the intertidal to about 55 m.

Up to now the species was reported from North Carolina, off Georgia, Cuba, Puerto Rico, Gulf of Mexico, Belize, Florida (KENSLEY & SCHOTTE 1989: 65), Brazil (BARNARD 1925: 148; KOENING 1972: 261) and from the Cape Verde Islands (BARNARD 1925: 148). It is first recorded from the Lesser Antilles. It should be noted that *A. crenulata* has not been found during the author's extensive field work at the Caribbean Coast of Colombia in 1985-86.

#### ***Accalathura setosa* Kensley, 1984 Figs 84-93**

*Accalathura setosa* KENSLEY, 1984a: 10-13, figs 7-8.

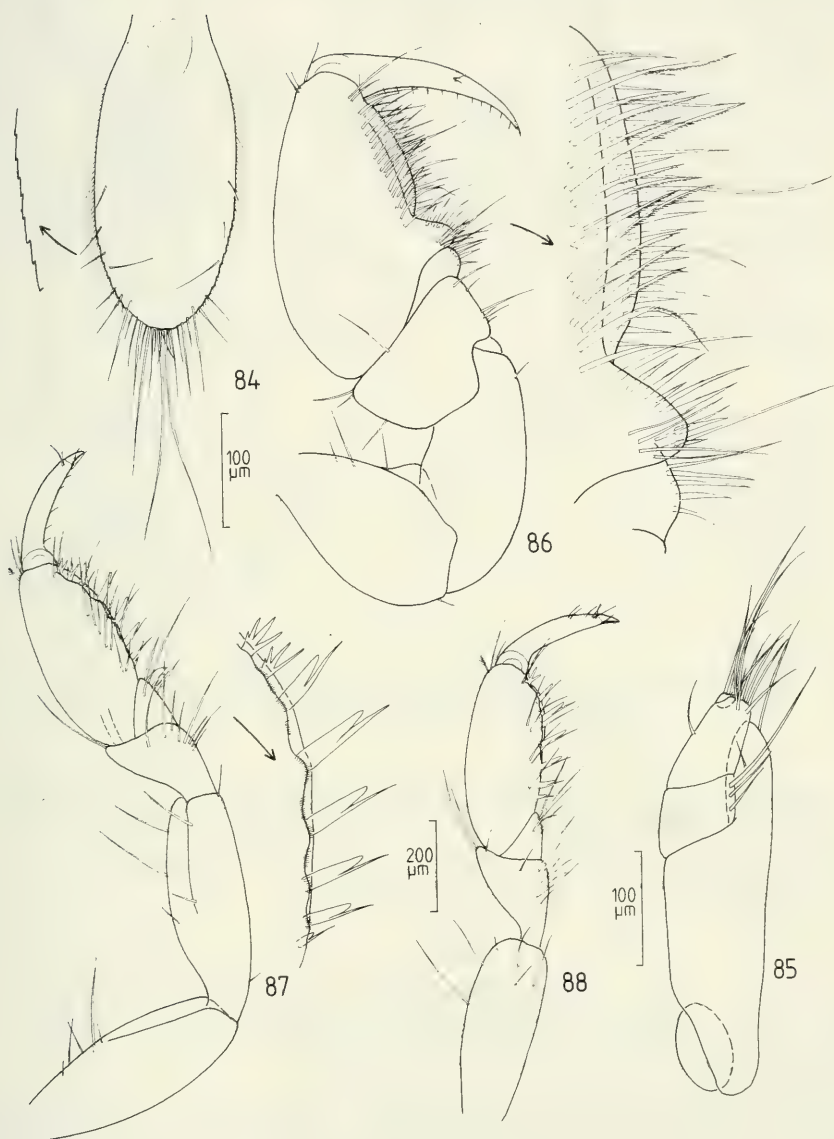
*Accalathura setosa*; KENSLEY & SCHOTTE, 1989: 65, fig. 29 E-H.

**M a t e r i a l .** — 2 immature adults (MHNG), Cap Chevalier; reef-flat of nearshore fringing reef; from mainly dead corals (*Porites*), 0.5-1.5 m, 11 April 1990.

**S u p p l e m e n t a r y d e s c r i p t i o n ,** immature adult. — Total length 5.9 mm. Telson tongue-shaped, 2.2 times longer than wide, with large proximal statocyst; distal third of telsonic margin faintly serrate; dorsal surface in distal half, near margin with some pairs of short simple setae; distal margin of telson with several setae of different lengths in characteristic arrangement.

Endite of maxilliped well developed, extending beyond distal half of second palp article; palp 3-articulated; second article longest, with 8 curved setae at mediobasal margin; proximal palp article with 3 setae at medial margin; terminal article minute, bearing 3 elongate simple setae. Pereopod 1 with propodus expanded; palm with strong proximal rounded hump bearing 8 spines and some simple setae; this hump more slender than in *Accalathura crenulata*; palm convex with many curved setae and spines, as figured; carpus twice wider than long, convex posterior margin with some setae and spines. Pereopod 2, propodus elongate-oval; palm convex, bearing 8 compound spines, two distal compound spines being branched; carpus roughly triangular, lacking free anterior margin. Propodus of pereopod 3 less expanded as in pereopod 2; palm slightly convex, bearing 7 compound spines, the distal one being branched. Pereopods 4-7 similar to each others, propodus and carpus rectangular; posterior margin of propodus with 3-4, of carpus with 2 compound spines; moreover, anterobasal margin of propodus in pereopod 7 with 3 slender spines. Pleopod 1, endopodite of 9/10 length of operculiform exopodite; distal margin of endopodite with 8, of exopodite with about 40 plumose setae (drawn as simple setae); setae of exopodite short and long, arranged in two rows; sympodite of pleopod 1 with 4 retinaculæ.

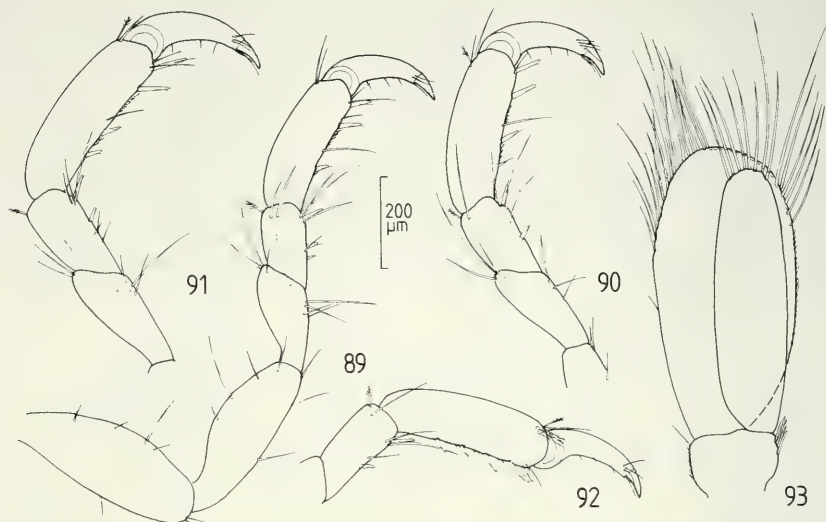
**R e m a r k s .** — It is necessary to give an additional description of that species, because some important features have been overlooked in the original description. In contrast to KENSLEY (1984a: 11, fig 7d) and KENSLEY & SCHOTTE (1989: 66, fig. 29 H)



FIGS 84-88.

*Accalathura setosa* Kensley, 1984, immature adult: 84, telson; 85, maxilliped; 86, pereopod 1; 87, pereopod 2; 88, distal pereopod 3.

the distal margin of the telson is faintly serrate and not smooth, as mentioned by these authors. Again, as in *Accalathura crenulata*, the palp of the maxilliped is 3-articulated, not 2-articulated as figured in the original description.



FIGS 89-93.

*Accalathura setosa* Kensley, 1984, immature adult: 89, pereopod 4; 90, distal pereopod 5; 91, distal pereopod 6; 92, distal pereopod 7; 93, pleopod 1.

All specimens of *A. setosa* have been found associated with dead coral substratum in very shallow water (0-1.5 m).

The species was known only from Belize. The present record therefore extends its known range considerably to the eastern Caribbean.

#### **Minyanthura** Kensley, 1982

#### ***Minyanthura corallicola*** Kensley, 1982 Figs 94-108

*Minyanthura corallicola* KENSLEY, 1982: 343-345, figs 157-158.

*Minyanthura corallicola*; NEGOESCU & WÄGELE, 1984: 127.

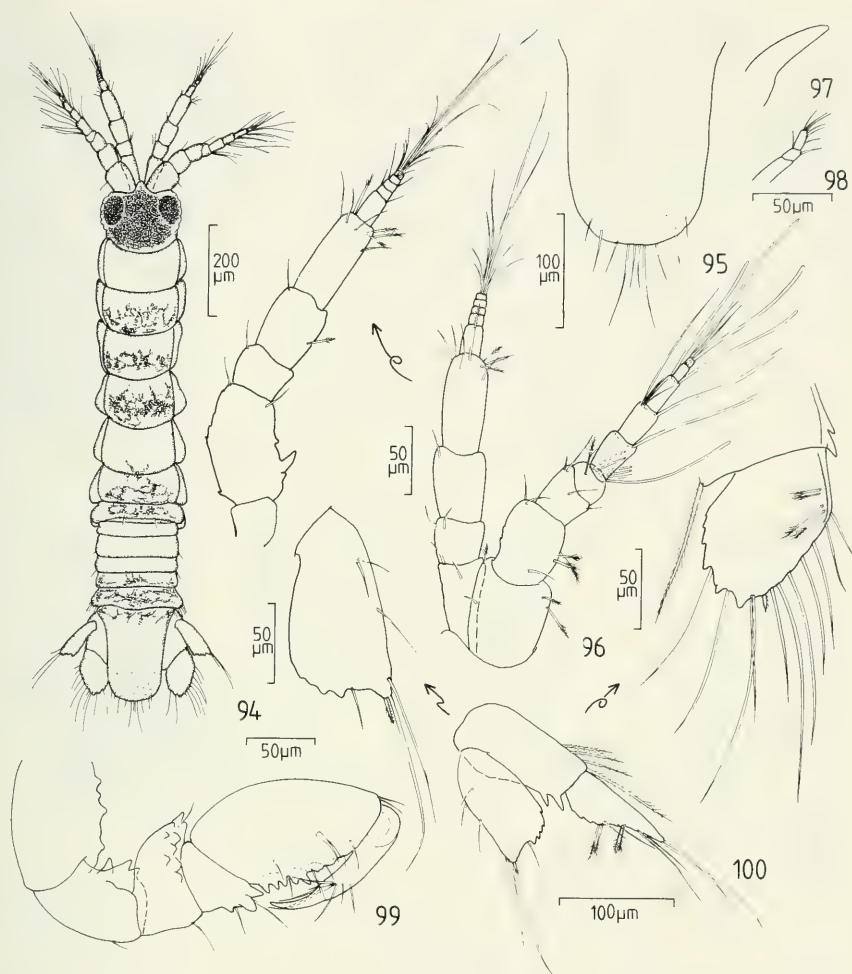
*Minyanthura corallicola*; KENSLEY & SNELGROVE, 1987: 195-196.

*Minyanthura corallicola*; KENSLEY & SCHOTTE, 1989: 53-55, fig. 23.

*Minyanthura corallicola*; MÜLLER, 1990: 186-189, figs 19-35.

**Material.** — 1♂ (MHNG), Petite Anse de Macabou; dead corals from nearshore patch reef; exposed reef flat and seaside margin, 0-2 m, 6-15 April 1990.

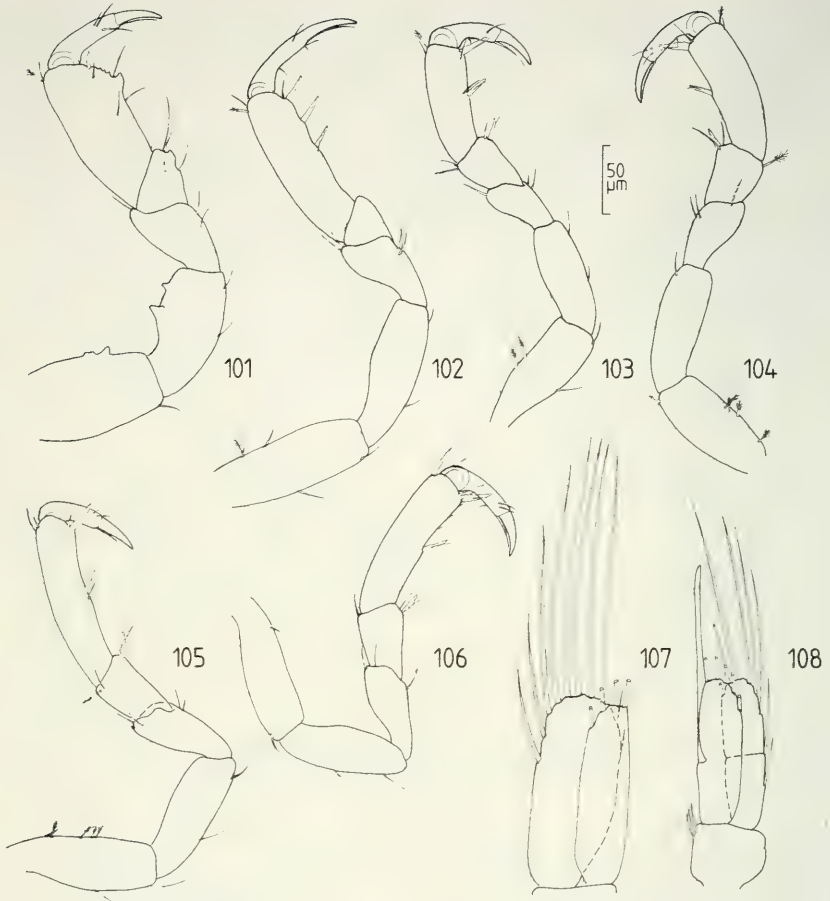
**Description**, ♂. — Body relatively robust, about 6 times longer than wide. Total length 1.1 mm. Cephalon wider than long, with very large and darkly pigmented



FIGS 94-100.

*Minyanthura corallicola* Kensley, 1982, ♂: 94, dorsal view; 95, telson; 96, antennae; 97, mandible; 98, three distal articles of maxillipedal palp; 99, pereopod 1; 100, uropod, endopodite and exopodite viewed from different angles.

dorsolateral eyes; rostrum distinct, roughly triangular; almost entire dorsal surface of head covered with brown pigment patch; pereonites 2-7, posterior pleonites and anterior telson with irregular pigment reticulations. Body proportions:  $C > 1 = 2 < 3 = 4 = 5 > 6 > 7$ . Pleonites free, first very short and hidden beneath posterior margin of pereonite 7, others subequal in length. Telson tongue-shaped, almost parallel-sided in two distal thirds and distal margin broadly rounded; dorsal surface of telson in distal half with several triangular, scale-like denticulations; distal margin of telson with 10 setae of different lengths in characteristic arrangement; no statocysts on telson observed.

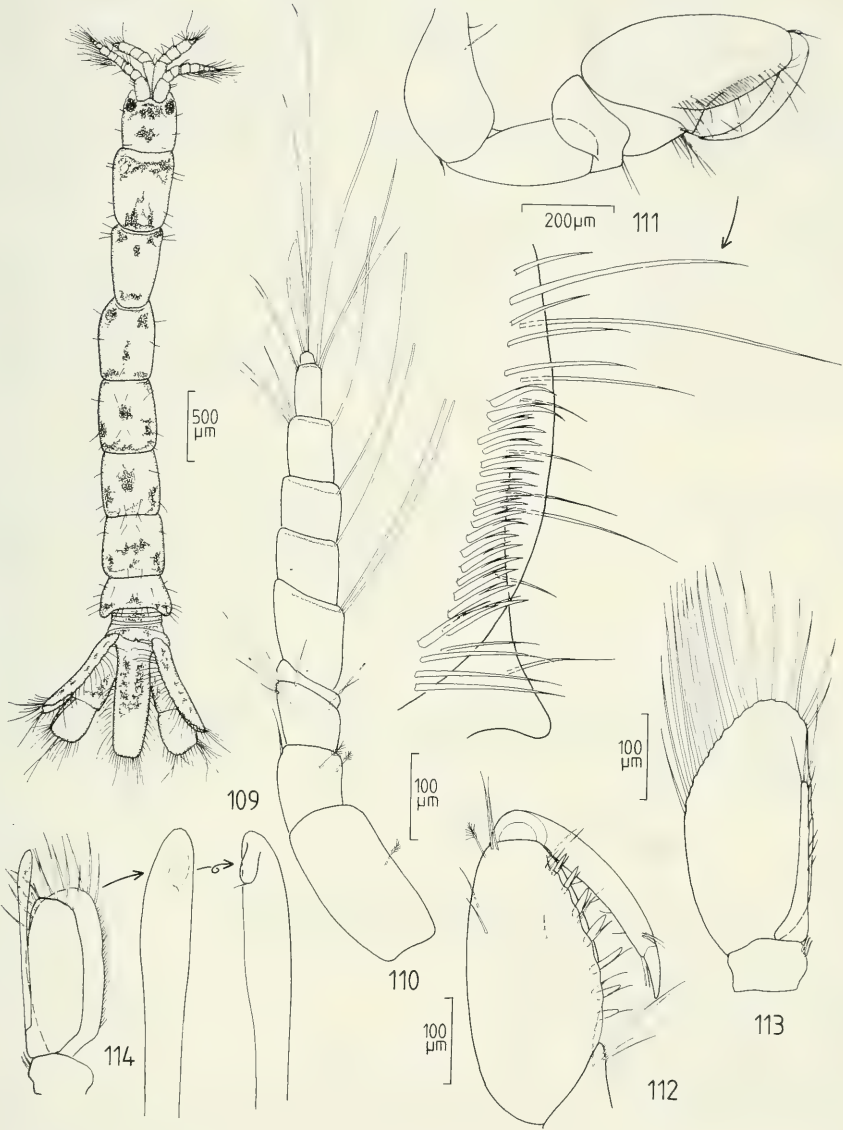


FIGS 101-108.

*Minyanthura corallicola* Kensley, 1982, ♂: 101, pereopod 2; 102, pereopod 3; 103, pereopod 4; 104, pereopod 5; 105, pereopod 6; 106, pereopod 7; 107, pleopod 1, sympodite damaged; 108, pleopod 2.

Antenna 1, peduncle 3-articulated; articles decreasing in size distally; flagellum 6-articulated; articles 1-4 with several filiform aesthetascs; articles 5 and 6 with only one filiform aesthetasc. Antenna 2, peduncle 5-articulated; second article longest and widest, ventrally with strong tooth and 2 denticles; articles 3-5 increasing in length distally; flagellum of 5 setose articles. Mandible reduced, roughly spine-shaped. Maxilla not observed, probably totally reduced. Maxilliped damaged during dissection, two distal palp articles setose. Pereopod 1 robust, propodus expanded; palm convex, with some robust teeth; carpus triangular with free anterior margin; posterodistal margin with 3 tooth-shaped tubercles; anterior margin of merus, ischium and basis with denticulations and shallow tubercles. Pereopod 2 relatively robust, propodus somewhat expanded; palm in





FIGS 109-114.

*Paranthura infundibulata* Richardson, 1902, ♂: 109, dorsal view; 110, antenna 1; 111, pereopod 1; 112, pereopod 2; 113, pleopod 1; 114, pleopod 2.

distal half with robust tooth and posterior of that tooth with some denticles and a short spine; carpus triangular; ischium and basis with 2 tooth-shaped tubercles at anterior margin, respectively. Pereopods 3-7 slender, in shape similar to each others; propodus elongate-rectangular, posterior margin with 2-3 compound spines; carpus in pereopod 3 triangular, in pereopods 4-7 roughly rectangular; carpus in pereopods 4-7 with posterodistal compound spine; propodus of pereopod 7 posterodistally and anterodistally with pair of spines. Pleopod 1, sympodite damaged; rami subequal in length, exopodite almost twice wider than endopodite; distal margin of endopodite with 4, of exopodite with 8 plumose setae (drawn as simple setae). Pleopod 2, sympodite with 3 retinaculæ; rami subequal in size; appendix masculina articulating at distal proximal half of endopodite, extending beyond ramus with 3/5 of its entire length; exopodite biarticulate; distal margin of endopodite with 5, of exopodite with 8 plumose setae (drawn as simple setae). Uropodal endopodite roughly oval, not extending beyond distal margin of telson, its medial margin distinctly dentate; distal margin of endopodite with short sensory spine and dorsal surface near ectal margin with 4 feathered sensory setae; uropodal exopodite distally produced into narrow lobe, bearing short sensory spine; sympodite slightly longer than rami, outer distal margin with 2 tooth-shaped tubercles.

**R e m a r k s .** — The mature ♂ of this species has never been described. The specimen mentioned as ♂ in the original description is a preparatory ♂. Like two other species of the genus recently discovered by the author in the tropical Indopazifik (MÜLLER 1990b: 380; in prep.), the ♂ of *M. corallicola* has free pleonites. A redescription of the ♀ is given in MÜLLER (1990a: 186), based on a specimen from the Caribbean Coast of Colombia.

*M. corallicola* has a vertical distribution from 0-24 m and was found associated with coral substratum.

The species was known from Belize, Jamaica, Barbados (KENSLEY & SCHOTTE 1989: 55), the Caribbean Coast of Colombia (MÜLLER 1990a: 186) and is first recorted from the Lesser Antilles.

**Paranthura** Bate & Westwood, 1866  
**Paranthura antillensis** Barnard, 1925

*Paranthura(?) antillensis* BARNARD, 1925: 156.

*Paranthura antillensis*; SCHULTZ, 1969: 95.

*Paranthura antillensis*; POORE, 1980: 63.

*Paranthura caribbensis* KENSLEY, 1982: 348-350, figs 161-162.

*Paranthura antillensis*; NEGOESCU & WÄGELE, 1984: 129.

*Paranthura antillensis*; KENSLEY & SCHOTTE, 1989: 69-71, fig. 31 A-F.

**Material.** — 1 immature adult (MHNG), Petite Anse de Macabou; seagrass beds (*Syringodium*, *Thalassia*), 0-1 m, 7 April 1990. 1 larvigerous ♀, 4 immature adults (MHNG), Madras, Baie de Tartane; dead corals in seagrass beds, 1-2 m, 18 April 1990. 1 ovigerous ♀, 3 immature adults (MHNG), Petite Anse de Macabou, algal vegetation on rocks and on nearshore patch reef, 0-1 m, 6-10 April 1990. 1 ♀, 3 immature adults (MNHN), Petite Anse de Macabou; dead corals from nearshore patch reef; exposed reef-flat and seaside margin, 0-2 m, 6-15 April 1990. 1 ovigerous ♀, 5 immature adults, 3 manca (MHNG), Cap Chevalier; reef flat of nearshore fringing reef; from mainly dead corals (*Porites*), 0.5-1.5 m, 11 April 1990.

**R e m a r k s .** — Although the species is recognizable, it also requires a complete redescription. This has not been done herein, because mature males have not been available to the author.

*P. antillensis* lives in a variety of substrates with a vertical distribution from the intertidal to about 32 m.

Up to now it was known from the U.S. Virgin Islands and Belize. It is noteworthy that it has not been collected during the author's field work at the Caribbean Coast of Colombia.

***Paranthura infundibulata* Richardson, 1902 Figs 109-114**

- Paranthura infundibulata* RICHARDSON, 1902: 284, figs 15-20.  
*Paranthura verrillii* RICHARDSON, 1902: 286, figs 21-22.  
*Paranthura infundibulata*; RICHARDSON, 1905: 76, fig. 62.  
*Paranthura verrillii*; RICHARDSON, 1905: 77, fig. 63.  
*Paranthura infundibulata*; BARNARD, 1925: 155.  
*Paranthura verrillii*; BARNARD, 1925: 155.  
*Paranthura infundibulata*; MENZIES & GLYNN, 1968: 11.  
*Paranthura verrillii*; MENZIES & GLYNN, 1968: 11.  
*Paranthura infundibulata*; SCHULTZ, 1969: 95.  
*Paranthura infundibulata*; CAMP, WHITING & MARTIN, 1977: 16.  
*Paranthura infundibulata*; POORE, 1980: 63.  
*Paranthura infundibulata*; KENSLEY, 1982: 350.  
*Paranthura infundibulata*; KENSLEY, 1984b: 33.  
*Paranthura infundibulata*; NEGOESCU & WÄGELE, 1984: 130.  
*Paranthura infundibulata*; KENSLEY 1987a: 133.  
*Paranthura infundibulata*; KENSLEY & SCHOTTE, 1989: 71-73, fig. 32F-J.  
*Paranthura infundibulata*; MÜLLER, 1990: 189-194, figs 36-54.

**M a t e r i a l .** — 3♂, 3♀ (2 ovigerous, 1 larvigerous), 12 immature adults, 3 postmancas, 3 mancas (MHNG), Petite Anse de Macabou; dead corals from nearshore patch reef, exposed reef-flat and seaside margin, 0-2 m, 6-15 April 1990. 1 larvigerous ♀, 4 immature adults, 1 manca (MNHN), Cap Chevalier; reef-flat of nearshore fringing reef, exposed location; from mainly dead corals (*Porites*), 0.5-1.5 m, 11 April 1990. 2♂, 4 immature adults, 1 postmanca (MHNG), La Trinité, bank reef west of Pte. Rouge; Anse Rivièrè, exposed reef flat, dead corals, 0-2 m, 12 April 1990.

**D e s c r i p t i o n ,** ♂: Body relatively slender, about 9 times wider than long. Total length about 5 mm. Eyes anterolaterally situated, of similar size to immature adult specimens and ♀. Dorsal surface of body with irregular pigment reticulations. Body proportions: C<1=2=3>4>5>6>7. All pereonites bearing some scattered setae. Pleonites free, subequal in length.

Antenna 1, peduncle 3-articulated; first article longer than second and third together; flagellum 7-articulated; first article very short, much wider than long; terminal article minute, bearing filiform aesthetasc; articles 2-6 with whorl of filiform aesthetascs. Pereopod 1, propodus expanded and oval in outline; palm convex, with proximal triangular hump; mesial surface near palm with about 19 curved compound spines and several simple setae of different lengths. Pereopods 2 and 3 similar to each others, propodus oval; palm convex, bearing 7 compound spines. Pereopods 4-7 similar to ♀ and immature specimens, generally more slender. Pleopod 1, endopodite narrow, 2/3 length of operculiform exopodite; medial margin of endopodite with 6 short plumose setae and 3 more longer distal plumose setae (drawn as simple setae); distal margin of exopodite with

17 plumose setae (drawn as simple setae); sympodite with 3 retinaculae. Pleopod 2, endopodite slightly smaller than exopodite; appendix masculina articulating at proximal 1/5 of endopodite, extending beyond ramus with 1/4 of its entire length; appendix masculina with distal rounded hook, tipped with short simple seta.

♀. — Similar to immature adult. Total length 5.9 mm.

Immature adult, postmanca and manca. — Similar in their habitus. Total length 4.9-6.0 mm, 3.0-3.1 mm and 2.5 mm, respectively.

**R e m a r k s .** — A description of the immature adult has yet been given by the author, based on specimens from the Caribbean Coast of Colombia (MÜLLER 1990a: 189). In this paper notes on the habits and geographic distribution are presented.

The species is newly reported from the eastern Caribbean.

## HYSSURIDAE

### **Eisothistos** Haswell, 1884

#### **Eisothistos petrensis** Kensley, 1984

*Eisothistos petrensis* KENSLEY, 1984a: 6-10, figs 4-6.

*Eisothistos petrensis*; KENSLEY, 1987a: 104.

*Eisothistos petrensis*; KENSLEY & SCHOTTE, 1989: 39, fig. 14A-E.

**M a t e r i a l .** — 1 immature adult (MHNG), Cap Chevalier; reef-flat of nearshore fringing reef; from mainly dead corals (*Porites*), 0.5-1.5 m, 11 April 1990.

**R e m a r k s .** — The species is known from several locations from the intertidal to depths of 36 m in the tropical Western Atlantic: Belize, Florida, Turks and Caicos Islands, U.S. Virgin Islands (KENSLEY & SCHOTTE 1989: 39), and Martinique.

## ZUSAMMENFASSUNG

Es wird über elf Arten mariner Anthuridea (Crustacea: Isopoda) aus verschiedenen Substraten von Martinique, Französische Antillen berichtet. *Amakusanthura geminsula* (Kensley, 1982), *Mesanthura paucidens* Menzies & Glynn, 1968 und *Accalathura crenulata* (Richardson, 1901) werden wiederbeschrieben. Ergänzende Beschreibungen werden für *Accalathura setosa* Kensley, 1984, *Minyanthura corallicola* Kensley, 1982 und *Paranthura infundibulata* Richardson, 1902 gegeben.



## REFERENCES

- BARNARD, K. H., 1925. A revision of the family Anthuridae (Crustacea Isopoda) with remarks on certain morphological peculiarities. *J. Linn. Soc. London, Zool.*, 36: 109-160.
- CAMP, D. K., N. H. WHITING & R. E. MARTIN, 1977. Marine Ecology at Hutchinson Island, Florida, 1971-1974, V: Arthropods. *Florida mar. Res. Publ.*, 25: 1-63.
- KENSLEY, B., 1979. New species of Anthurideans from the Cook and Fiji Islands (Crustacea: Isopoda: Anthuridea). *Proc. biol. Soc. Wash.*, 92 (4): 814-836.
- 1982. Anthuridea (Crustacea: Isopoda) of Carrie Bow Cay, Belize. *Smiths. Contr. mar. Sci.*, 12: 321-353.
- 1984a. The Atlantic Barrier Reef Ecosystem at Carrie Bow Cay, Belize, III: New marine Isopoda. *Smiths. Contr. mar. Sci.*, 24: 1-81.
- 1984b. The role of isopod crustaceans in the reef crest community at Carrie Bow Cay, Belize. *Mar. Ecol.*, 5 (1): 29-44.
- 1987a. A re-evaluation of the systematics of K. H. Barnard's review of Anthuridean Isopods. *Steenstrupia*, 13 (3): 101-139.
- 1987b. Further records of marine isopod crustaceans from the Caribbean. *Proc. biol. Soc. Wash.*, 100 (3): 559-577.
- KENSLEY, B. & P. SNELGROVE, 1987: Records of marine isopod crustaceans associated with the coral *Madracis mirabilis* from Barbados. *Proc. biol. Soc. Wash.*, 100 (1): 186-197.
- KENSLEY, B. & M. SCHOTTE, 1989: Guide to the marine isopod crustaceans of the Caribbean. *Smiths. Inst. Press* (N. Dutro ed.): 1-308.
- KOENING, M. L., 1972. Occorencia de *Accalathura crenulata* (Richardson, 1901) no Brasil (Isopoda-Paranthuridae). *Trab. Oceanogr., Univ. Fed. Pernambuco, Recife*, 13: 261-270.
- MENZIES, R. J. & P. W. GLYNN, 1968. The common marine isopod crustacea of Puerto Rico. *Stud. Fauna Curaçao and other Caribb. Isl.*, 27: 1-133.
- MENZIES, R. J. & W. L. KRUCZYNSKI, 1983. Isopod Crustacea (exclusive of Epicaridea). *Mem. Hourglass Cruises*, VI (I): 1-126.
- MILLER, M. A. & R. J. MENZIES, 1952. The isopod crustacea of the Hawaiian Islands, III. Superfamily Flabellifera, family Anthuridae. *Occ. pap. Bernice P. Bishop. Mus.*, XXI (1): 1-15.
- MÜLLER, H.-G., 1990a. Paranthurid isopods from the Caribbean Sea of Colombia (Crustacea). *Bull. Zool. Mus. Univ. Amsterdam*, 12 (13): 181-195.
- 1990b. Anthuridea from coral reefs at Réunion Island, southern Indian Ocean (Crustacea: Isopoda). *Senckenbergiana biol.*, 70 (1989) (4/6): 359-395.
- 1991. Anthuridae from coral reefs at Bora Bora and Moorea, Society Islands, with description of three new species (Crustacea: Isopoda). *Senckenbergiana biol.*, in press.
- NEGOESCU, I. & J. W. WÄGELE, 1984. World list of the anthuridean isopods (Crustacea, Isopoda, Anthuridea). *Trav. Mus. Hist. Nat. «Grigore Antipa»*, XXV: 99-146.
- NIERSTRASZ, H. F., 1941. Die Isopoden der Siboga-Expedition IV. Isopoda Genuina. III. Gnathiidea, Anthuridea, Valvifera, Asellota, Phreatoicoidea. *Siboga Exp. Monogr.*, 32d: 235-308.



- POORE, G. C. B., 1980: A revision of the genera of the Paranthuridae (Crustacea: Isopoda: Anthuridea) with a catalogue of species. *Zool. J. Linn. Soc.*, 68: 53-67.
- RICHARDSON, H., 1901. Key to the Isopods of the Atlantic Coast of North America with descriptions of new and little known species. *Proc. U.S. Natn. Mus.*, 33 (1222): 493-579.
- 1902. The marine and terrestrial isopods of the Bermudas, with descriptions of new genera and species. *Trans. Conn. Acad. Sci.*, 11: 277-310.
- 1905. A monograph of the Isopods of North America. *Bull. U.S. Natn. Mus.*, 54: 1-727.
- SCHULTZ, G. A., 1969. How to know the marine Isopod Crustaceans. *Pictured Key Nature Ser.* 1-359.
- WÄGELE, J. W., 1984. Redescription of K. H. Barnard's three species of Mesanthura (Crustacea: Isopoda: Anthuridea). *J. Nat. Hist.*, 18: 389-403.